REMARKS

Entry of the foregoing, reexamination and reconsideration of the application identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.112, and in light of the remarks which follow, are respectfully requested.

The disclosure has been objected to for reasons set forth in paragraph (1) of the Official Action. In response thereto, the specification has been amended to remove the terminology deemed objectionable by the Examiner. Specifically, the words "carry", "carries" and being "carried" on pages 3-4 have been eliminated. The term "carrier" has been deleted on pages 6-7. The definition of Yield (RR) on page 15 has been corrected. It is submitted that the disclosure, as amended, is now free of any terminology considered unclear by the Examiner.

Claim 5 was rejected under 35 U.S.C. §112, second paragraph, for the reasons set forth in paragraph (3) of the Official Action. In response thereto, the claim has been amended to insert suitable Markush terminology. Accordingly, this rejection should be withdrawn.

Claim 7 was rejected under 35 U.S.C. §112, second paragraph, for the reason set forth in paragraph (4) of the Official Action. In response thereto, the word "carrier" has been deleted from claims 7-13. Accordingly, this rejection should be withdrawn.

Claim 17 was rejected under 35 U.S.C. §112, second paragraph, for the reasons set forth in paragraph (5) of the Official Action. In response thereto, the expression "in the region of" has been deleted. Accordingly, this rejection should be withdrawn.

Claim 26 was rejected under 35 U.S.C. §112, second paragraph, for the reasons set forth in paragraph (6) of the Official Action. In response thereto, the claim has been amended to clarify that the production of 4-hydroxy benzaldehyde and vanillin and analogues occurs by oxidation of the recited mandelic acids. Accordingly, this rejection should be withdrawn.

Claims 2-6, 13-16, 18-23, and 27 were rejected under 35 U.S.C. §102(b) as anticipated by Hoefnagel et al. (WO 94/14746) for reasons set forth in paragraph (8) of the Action. The Office Action refers to Example 3 of Hoefnagel et al. which discloses using zinc oxalate as a catalyst and postulates that oxalic acid would be generated in situ "from the glyoxylic acid in aqueous base via Cannizzaro's reaction" (page 5, line 2). Reconsideration of this rejection is requested in view of the following comments.

The present invention relates to a process for preparing p-hydroxy mandelic compounds by reacting a hydroxylated aromatic compound with glyoxylic acid in water in the presence of an alkaline agent and in the presence of a catalytically effective amount of a polycarboxylic compound. It has been discovered that the presence of a carboxylic compound such as oxalic acid in catalytically effective amounts, unexpectedly provides increased yields of the desired products. None of the art cited by the Examiner discloses reacting a hydroxylated aromatic compound with glyoxylic acid in the presence of catalytically effective amounts of a polycarboxylic compound.

Applicants fail to see any specific disclosure in Hoefnagel et al. of a polycarboxylic compound used in catalytically effective quantities. For a claim to be anticipated under 35 U.S.C. §102, the reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present. To support an anticipation rejection based on inherency, the Examiner must provide factual and technical grounds establishing that the inherent feature necessarily flows from the teaching of the prior art. See *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Int. 1990). See also *In re Oelrich*, 212 USPQ 323, 326 (CCPA 1981), which holds that inherency must flow as a necessary conclusion from the prior art, not simply a possible one. Absent a disclosure of a polycarboxylic compound in catalytically effective amounts or any factual or technical basis supporting the Examiner's assertion that oxalic acid is inherently produced in the process of Hoefnagel et al. in catalytically effective amounts as claimed, Hoefnagel et al. cannot anticipate the rejected claims. Accordingly, it is requested that this rejection be withdrawn.

Claims 2-6, 13, 15-24, 25 and 27 were rejected under 35 U.S.C §102(b) as anticipated by Schouteeten et al. (U.S. 4,339,602) for reasons expressed in paragraphs (9) and (10) of the Action. The Office Action postulates that oxalic acid is inherently produced *in situ* via a Cannizzalo reaction of glyoxylic acid in aqueous base. This rejection is respectfully traversed for the following reasons.

As indicated above, it is well established that "[t]he fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." In *re Rijckaert*, 9F.3d 1531, 1534, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' In re *Robertson*, 169F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999)." "In relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 U.S.P.Q.2d 1461, 1464 (Bd. of Pat. Apps. & Inter. 1990)." Note M.P.E.P. §2112. Based on these principles, Applicants respectfully submit that there is no basis in fact and/or technical reasoning to reasonably support a conclusion that the allegedly inherent characteristic (i.e., catalytically effective amount of oxalic acid) necessarily flows from the disclosure of Schouteeten et al. Accordingly, it is requested that this rejection be withdrawn.

Claims 7-12 were rejected under 35 U.S.C. §103(a) as unpatentable over Hoefnagel et al. (WO 94/14746) as applied to Claims 27 and 6 above, and further in view of Sychev (Chem. Abst. 117:191094) for reasons set forth in paragraph (14) of the Office Action. Reconsideration of this rejection is requested in view of the following.

As discussed above, there is no evidence to show that any oxalic acid is produced *in situ* in the reaction described by Hoefnagel et al., let alone being produced in catalytically effective amounts sufficient to increase the yield of the desired hydroxymandelic compounds. The secondary art, the article by Sychev, does not disclose using polycarboxylic compounds to catalyze the reaction between a hydroxylated aromatic compound and glyoxylic acid . Thus, the Sychev article does not supply the deficiencies of Hoefnagel et al. and the rejection based on §103(a) should be withdrawn.

Claim 26 was rejected under 35 U.S.C. §103(a) as unpatentable over Hoefnagel et al. (WO 94/14746) or Schouteeten et al. (U.S. 4,339,602) as applied to Claim 27 further in view of Umemura et al. (U.S. 4,165,341) for reasons expressed in paragraph (15) of the Office Action. Reconsideration of this rejection is requested.

The '341 Umemura patent is relied upon solely to disclose the copper oxide-catalyzed oxidation of 4-hydroxy-3-methoxymandelic acid. It does not disclose reacting hydroxylated aromatic compounds with glyoxylic acid in the presence of catalytic quantities of a polycarboxylic compound. Accordingly, the disclosure of Umemura '341 does not supply the deficiencies of Hoefnagel et al. or Schouteeten et al. and for this reason, the rejection should be withdrawn.

In view of the above amendments and remarks, it is respectfully submitted that this application is now in allowable condition. An early and favorable indication to that effect is earnestly solicited.

Respectfully submitted,

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Date: March 18, 2002

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Page 2, Paragraph Beginning at Line 25

A precise subject of the present invention is a process for the preparation of optionally substituted p-hydroxymandelic compounds and derivatives, which consists in carrying out the condensation, in water, in the presence of an alkaline agent, of an aromatic [carrier] compound with at least one hydroxyl group and the para position of which is free, with glyoxylic acid, said process being characterised in that the reaction is carried out in the presence of an effective quantity of a [carrier] catalyst compound with at least two carboxylic functions.

Page 3, Paragraph Beginning at Line 10

The aromatic nucleus [carries] has at least one hydroxyl group, but it can also [carry] have one or more other substituents. Generally, "several substituents" means less than four substituents per aromatic nucleus.

Paragraph Bridging Pages 3 and 4

Therefore, the process according to the invention is well suited for use with hydroxylated aromatic compounds corresponding to the following formula (I):

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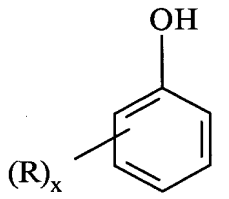

(I)

in which formula (I):

-the para position is free,

-x is an integer between 1 and 4,

-R represents:

- a hydrogen atom,

- a hydrocarbon group having from 1 to 20 carbon atoms selected from the alkyl, alkoxy, hydroxyalkyl, cycloalkyl, aryl, phenoxy, alkoxyalkyl, fluoroalkyl, hydroxyalkoxyalkylene groups,

- a hydroxyl group,

- a -CHO group,

- an acyl group having from 2 to 6 carbon atoms,

- a halogen atom, preferably a fluorine, chlorine or bromine atom,

- two R groups placed on two vicinal carbon atoms can form together [and] with the carbon atoms [which carry them] to which they are attached, a benzene ring.

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Page 4, Paragraph Beginning at Line 10

Examples of R radicals which [are capable of being carried by] can be attached to the aromatic nucleus are given hereinafter:

- alkyl radicals, such as methyl, ethyl, propyl, isopropyl, butyl, isobutyl, sec-butyl, tert-butyl, n-octyl, 2-ethyl hexyl, decyl, octadecyl, eicosly,
- alkoxy radicals, such as methoxy, ethoxy, propoxy, isopropoxy, butoxy, isobutoxy, sec-butoxy, tert-butoxy, hexyloxy, decyloxy, hexadecylocy, octadecylocy, or a phenoxy radical,
- hydroxyalkyl radicals, such as hydroxymethyl, hydroxyethyl, hydroxypropyl, hydroxyhexyl, hydroxydecyl,
- cycloalkyl radicals, such as cylcopentyl, cyclohexyl, cycloheptyl,
- fluoroalkyl radicals, such as fluoromethyl, diflyoromethyl, trifluoromethyl, fluoroethyl, 1,1,1-trifluoro ethyl, pentafluoroethyl, fluoropropyl, fluorobutyl, tribluoroamyl,
- hydroxyalkyoxyalkylene radicals, such as hydroxymethyloxyethylene, hydroxyethyl di-(oxyethylene), hydroxyethyl tri-(oxyethylene), 1,2-hydroxyethyloxypropylene, hydroxyethyloxybutylene, hydroxypropyloxypropylene, hydroxybutyloxybutylene, hydroxybutyl di-(oxybutylene),
- halogen atoms, such as fluorine, chlorine, bromine, or iodine.

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Page 6, Paragraph Beginning at Line 31

Of the list of afore-mentioned compounds, the aromatic [carrier] compounds preferably used which have at least one hydroxyl group are: phenol, o-cresol, m-cresol, 3-ethyl phenol, 2-tert-butyl phenol, guaiacol, guetol.

Page 7, Paragraph Beginning at Line 10

The [carrier] compounds with at least two carboxylic functions of general formula (II) in which R_1 represents a valency bond or a divalent radical preferably having 1 to 15 carbon atoms are quite particularly suitable for implementation of the process according to the invention.

Page 7, Paragraph Beginning at Line 14

The [carrier] compounds with at least two carboxylic functions of general formula (II) in which R_1 represents a linear or branched, saturated or unsaturated aliphatic residue are particularly well suited for use of the process according to the invention.

Page 8, Paragraph Beginning at Line 6

The [carrier] compounds with at least two carboxylic functions of general formula (II) in which R_1 represents a monocylic or polycyclic hydrocarbon residue are also suitable for implementation of the process according to the invention.

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Paragraph Bridging Pages 8 and 9

The [carrier] compounds having at least two carboxylic functions can correspond to general formula (II) in which the R_1 radical represents a polycyclic aromatic hydrocarbon divalent residue; the rings can form between themselves ortho condensed, ortho- and peri-condensed systems. More particularly, a naphthylenic residue can be mentioned; said rings being able to be substituted by 1 to 4 R_3 radicals, preferably by 1 to 3, R_3 having the meanings stated hereinabove for the substituents of the aromatic hydrocarbon residue of general formula (III).

Page 9, Paragraph Beginning at Line 4

In general formula (II) of the [carrier] compounds with at least two carboxylic functions, R_1 can also represent a carbocyclic residue which is saturated or which comprises 1 or 2 unsaturations in the ring, generally having from 3 to 7 carbon atoms, preferably 6 carbon atoms in the ring; said ring being able to be substituted by 1 to 5, preferably 1 to 3, R_3 radicals, R_3 having the meanings stated hereinabove for the substituents of the aromatic hydrocarbon residue of general formula (III).

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Page 9, Paragraph Beginning at Line 13

The [carrier] compounds with at least two carboxylic functions can also correspond to formula (II) in which R_1 represents a divalent radical constituted by a chain formation of two to four residues as defined hereinabove, an aliphatic residue, an aromatic residue, or a cycloaliphatic residue. These can be connected together by a valency bond or by a function group which can be, in particular, a group selected from the groups called Y.

Paragraph Bridging Pages 9 and 10

The following [carrier] compounds with at least two carboxylic functions can be mentioned, quite particularly, by way of catalysts which are suitable for the present invention:

- dicarboxylic aliphatic acids, such as:

. oxalic acid

. malonic acid

. succinic acid

. glutaric acid

. adipic acid

. 2,4-dimethyl adipic acid

. pimelic acid

. suberic acid

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. azelaic acid

. sebacic acid

. dodecane dioic acid

. fumaric acid

. maleic acid

- cycloalkanedicarboxylic acids, such as cyclohexane 1,4-dicarboxylic acid,

- aromatic dicarboxylic acids, such as:

. phthalic acid

. isophthalic acid

. terephthalic acid

. phenylenediacetic acid

. naphthalene 1,5-dicarboxylic acid

. naphthalene 1,6-dicarboxylic acid

. 4,4'-diphenylcarboxylic acid

. 3,3'-diphenylcarboxylic acid

. bis(4-hydroxycarbonyl) phenyl oxide

. bis(3-hydroxycarbonyl) phenyl oxide

. 4,4'-dihydroxycarbonyl diphenylsulphone

. 3,3'-dihydroxycarbonyl diphenylsulphone

- pyrimidine or imidazole dicarboxylic acids.

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Page 15, Paragraph Beginning at Line 5

$$\text{Yield (RR)} = \frac{\text{number of moles of mandelic acid formed}}{\text{number of moles of [mandelic acid] quaiacol}}$$

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Marked-up Claims 5, 7-13, 17 and 26

5. (Twice Amended) A process according to one of claim 27, wherein the hydroxylated aromatic compound of formula (I) is selected from the group consisting of phenol, o-cresol, m-cresol, 3-ethyl phenol, 2-tert-butyl phenol, guaiacol, guetol, and 2-isopropoxy phenol.

7. (Twice Amended) A process according to claim 6, wherein the catalyst is a [carrier] compound having at least two carboxylic functions corresponding to formula (II) wherein R_1 symbolises a substituted or non-substituted hydrocarbon radical which can be a linear or branched, saturated or unsaturated acyclic aliphatic radical; a monocyclic or polycyclic, saturated, unsaturated, or aromatic carbocyclic radical; a monocyclic or polycyclic, saturated, unsaturated or aromatic heterocyclic radical.

8. (Twice Amended) A process according to claim 6, wherein the catalyst is a [carrier] compound with at least two carboxylic functions corresponding to formula (II), in which R_1 represents a linear or branched, acyclic aliphatic residue having 1 to 12 carbon atoms, saturated or containing one or more unsaturations on the chain which can be single or conjugated double bonds, or triple bonds-, the hydrocarbon chain can optionally be:

(1) - interrupted by one of the following aroups called Y:

$$-O-;-CO-;-COO-;-\underset{\displaystyle R_2}{\underset{|}{N}}-;-CO-\underset{\displaystyle R_2}{\underset{|}{N}};-S-;-SO_2-$$

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Marked-up Claims 5, 7-13, 17 and 26

in which formulae R_2 represents hydrogen or a linear or branched alkyl radical having 1 to 4 carbon atoms, or a radical of $-(CH_2)_p$ - COOH type in which p is a number between t and 5,

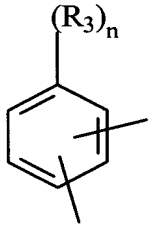
(2) - and/or bearing one of the following substituents:

- OH; - COOH; - CHO; - NO_P; - CN; - NH_2; - SH; -X; CF_3

- NH - $[(CH2)_P$ - COOH] or - N - $[(CH2)_P$ - $COOH]_2$

with X representing a halogen atom, and p having the meaning given hereinabove.

9. (Twice Amended) A process according to claim 6, wherein the catalyst is a [carrier] compound with at least two carboxylic functions corresponding to formula (II), in which R_1 represents a benzene residue corresponding to the general formula (III):



(III)

in which formula (III):

- n is an integer from 0 to 4,

- R_3 represents one of the following groups or functions,

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Marked-up Claims 5, 7-13, 17 and 26

- hydrogen atom,
- linear or branched alkyl radical having from I to 4 carbon atoms,
- linear or branched alkoxy radical having from I to 4 carbon atoms,
- methylene or ethylene dioxy radical,
- -CHO group,
- phenyl or benzyl radical,
- halogen atom.

10. (Twice Amended) A process according to claim 6, wherein the catalyst is a [carrier] compound with at least two carboxylic functions corresponding to formula (II) in which the R1 radical represents a polycyclic aromatic hydrocarbon divalent residue; the rings can form between themselves ortho-condensed, ortho- and peri-condensed systems.

11. (Twice Amended) A process according to claim 6, wherein the catalyst is a [carrier] compound with at least two carboxylic functions corresponding to formula (II), in which RI represents a carbocyclic residue which is saturated or contains I or 2 unsaturations in the ring.

12. (Twice Amended) A process according to claim 6, wherein the catalyst is a [carrier] compound with at least two carboxylic functions corresponding to formula (II), in which R_1 represents a divalent radical constituted by a chain formation of two to four

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Marked-up Claims 5, 7-13, 17 and 26

residues as defined hereinabove, an aliphatic residue, an aromatic residue or a cycloaliphatic residue, connected together by a valency bond or by a function group.

13. (Twice Amended) process according to claim 6, wherein the catalyst is a [carrier] compound with at least two carboxylic functions corresponding to formula (II) selected from the group consisting of:

· oxalic acid

· malonic acid

· succinic acid

· glutaric acid

· adipic acid

· 2,4-dimethyl adipic acid

· pimelic acid

· suberic acid

· azelaic acid

· sebacic acid

· dodecane dioic acid

· fumaric acid

· maleic acid

· cyclohexane 1,4-dicarboxylic acid,

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Marked-up Claims 5, 7-13, 17 and 26

· phthalic acid

· isophthalic acid

· terephthalic acid

· phenylenediacetic acid

· naphthalene 1,5-dicarboxylic acid

· naphthalene 1,6-dicarboxylic acid

· 4,4'-diphenylcarboxylic acid

· 3,3'-diphenylcarboxylic acid

· bis(4-hydroxycarbonyl) phenyl oxide

· bis(3-hydroxycarbonyl) phenyl oxide

· 4,4'-dihydroxycarbonyl diphenylsulphone

· 3,3'-dihydroxycarbonyl diphenylsulphone

· ethylenediaminotetracetic acid (E.D.T.A.)

· diethylenetriaminopentacetic acid (D.T.P.A.)

· nitrilotriacetic acid (N.T.A.) and

· N-(2-hydroxyethyl)ethylene diarninotriacetic acid (H.E.D.T.A.).

17. (Twice Amended) A process according to claim 27, wherein the quantity of

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Marked-up Claims 5, 7-13, 17 and 26

alkali metal hydroxide is [in the region of, or equal to,] the stoichiometric quantity necessary to salify all the salifiable groups of the hydroxylated aromatic compound of formula (I) and to salify the carboxylic function of the glyoxylic acid.

26. (Twice Amended) A process for the production of 4-hydroxy benzaldehyde and vanillin and analogues by oxidation of [said acids using] p-hydroxymandelic acid [and], 3-methoxy p-hydroxymandelic acid, 3-ethoxy p-hydroxymandelic acid, or 3-isopropoxy p-hydroxymandelic acid obtained in accordance with claim 27.